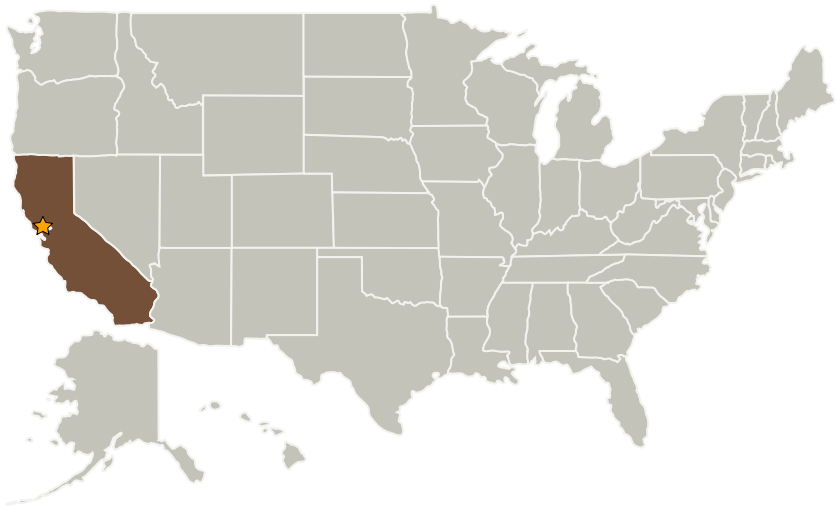
Low-Cost Suite of COTS GNC Sensors for Precision Lunar Lander, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

We are proposing to exploit (in an innovative way) existing, readily available, GNC sensors for the purpose of precision lunar landing. Majority of previous lunar lander concepts with the precision/pinpoint landing capability required expensive and risky development of new GNC and landing sensors (scanning lidars, multi-beam mm-ww radar, etc.). Our proposed alternative consists solely of existing and low-cost sensors that synergistically leverage each capability and compensate for individual sensor weaknesses. For example, we can use a simple single-beam low-frequency radar altimeter (available at low-cost off-the-shelf, and proven on several Mars lander missions). The low-frequency radar can meet the maximum slant range requirements much easier than the mm-wave sensor but it does not have the adequate multiple narrow beam capability of the Apollo LM or Viking lander radar. However, the optical descent imaging measurement (using DSMAC-type sensor) can supplement the single beam radar measurement and obtain the same information about the complete state vector. There are several similar concepts implemented in this sensor suite of complementing strengths and weakness of individual sensors.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Stellar Exploration, Inc.	Supporting Organization	Industry	San Luis Obispo, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Tomas Svitek

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.4 Atmosphere and Surface Characterization